

Public Meeting for Proposed Ordinance 2020-04

Commercial Solar Photovoltaic and Energy
Efficiency Measures for Climate Action Plan
Consistency

June 15, 2020 at 4:00 PM - Virtual Meeting



Virtual Meeting Features

- Presenters visible via webinar
- Participants muted, only visible to host
- Participants may ask questions using “Q&A” feature
- Presenters answer questions live at end of meeting
- Chat feature disabled



INTRODUCTIONS

City Staff

Crystal Najera, Climate Action Plan Program Administrator

Mark Delin, Assistant City Manager

Dominique Dashwood, CivicSpark Fellow

Energy Policy Initiatives Center

Scott Anders, Director

Joseph Kaatz, Staff Attorney

Marc Steele, Technical Policy Analyst



MEETING AGENDA

1. Climate Action Plan Background
2. Summary of proposed Ordinance 2020-04
3. Overview of Cost Effectiveness and Support Programs
4. Questions and Answers
5. Next steps

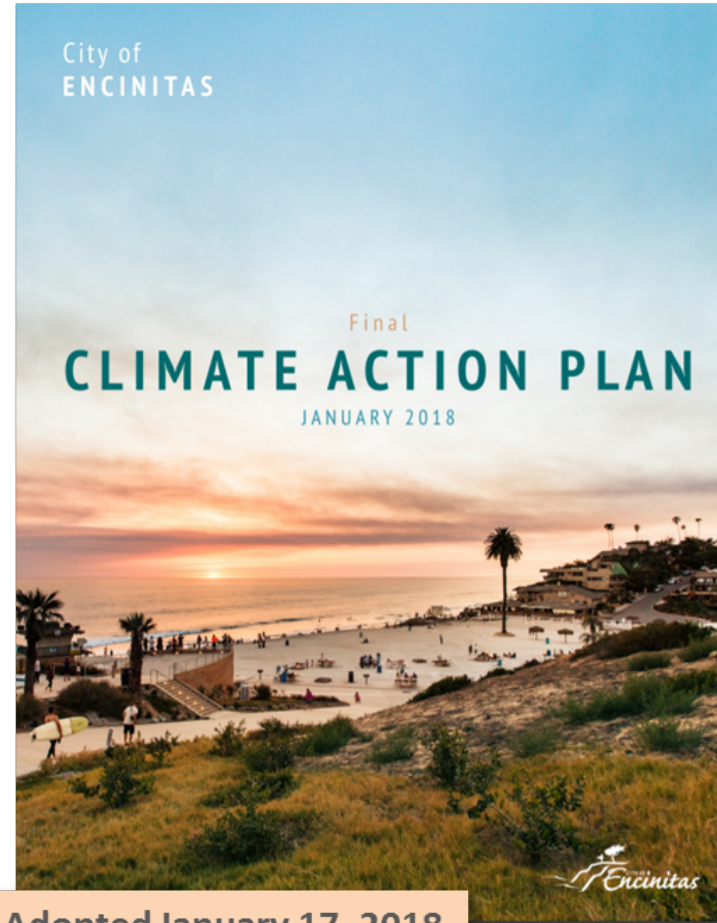


Climate Action Plan Background



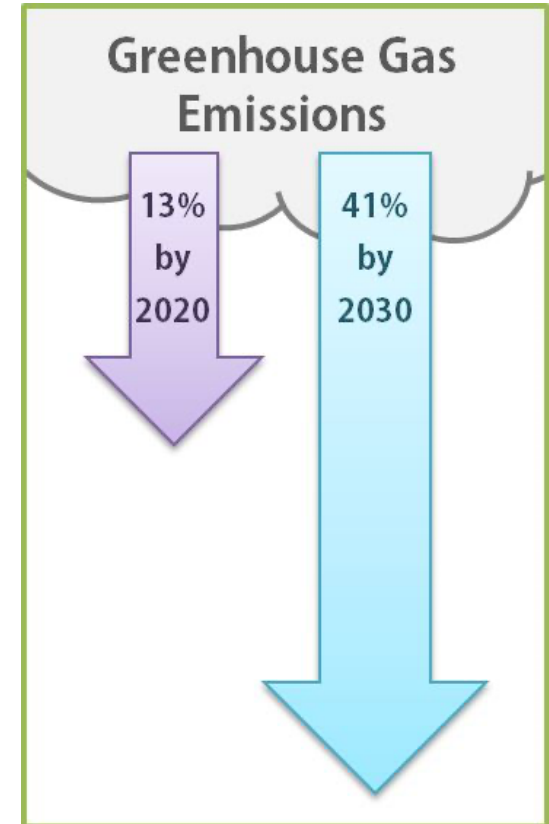
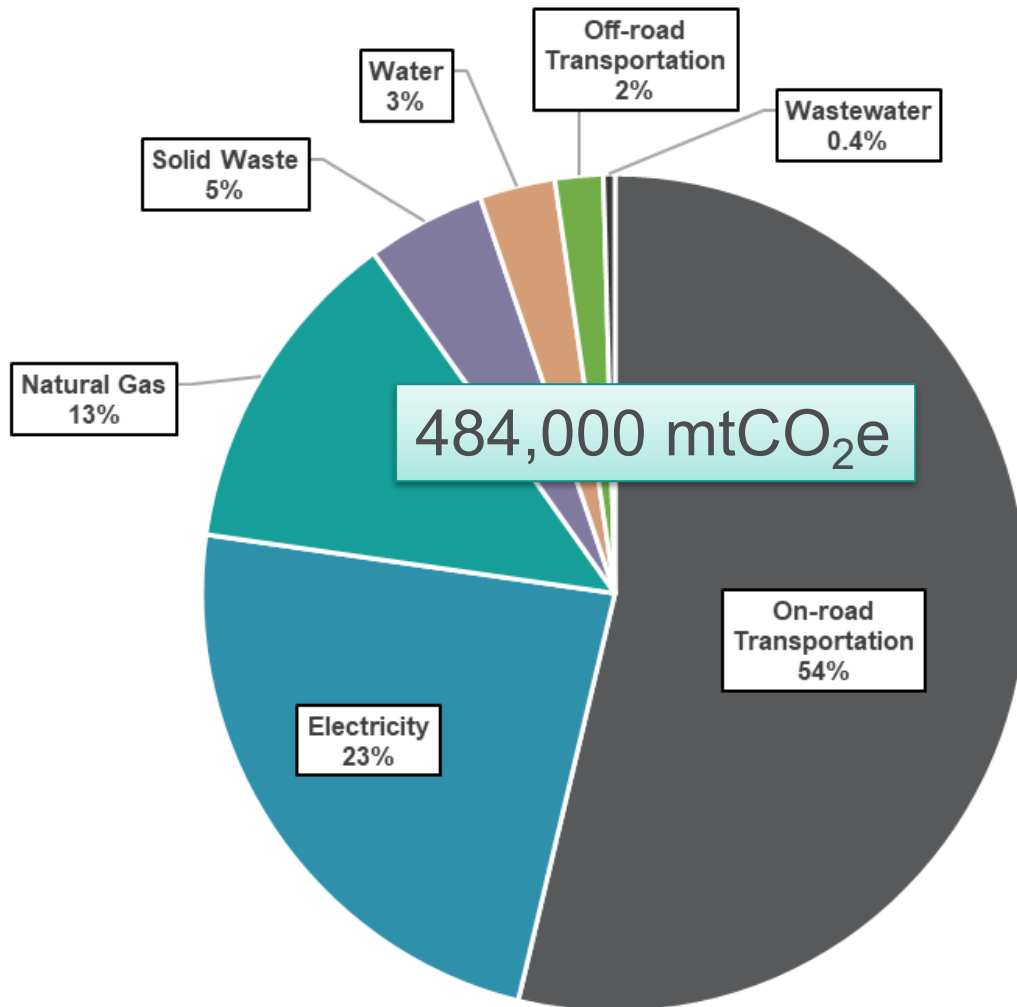
WHAT IS A CLIMATE ACTION PLAN?

- Greenhouse Gas Emissions
 - Inventory and Projection
 - Emissions Reduction Targets
- 19 City Actions
- Climate adaptation
- Monitoring and tracking



Adopted January 17, 2018

GHG EMISSIONS INVENTORY (2012)



COMMERCIAL BUILDING CAP MEASURES

- **RE-3** Require Commercial Buildings to install Solar Photovoltaic Systems
- **BE-3** Adopt Higher Energy Efficiency Standards for Commercial Buildings
- **BE-4** Require Commercial Buildings to Install Solar Water Heaters



STEPS TO ESTABLISHING A REACH CODE

1. Evaluate existing reach code examples in CA
2. Identify code parameters:
 - Applicability, Requirement Specifications, Exemptions
3. Evaluate Cost-Effectiveness (CA requirement)
 - Considers Requirements, Climate Zone, Life-Cycle Costs
4. Receive Public Input
5. Finalize Draft Ordinance
6. Council Adoption



COMMERCIAL BUILDING CAP MEASURES

- **RE-3** Require Commercial Buildings to install Solar Photovoltaic Systems
- **BE-3** Adopt Higher Energy Efficiency Standards for Commercial Buildings
- ~~**BE-4** Require Commercial Buildings to Install Solar Water Heaters~~ — found **not Cost Effective**



PROJECT STATUS AND NEXT STEPS

1. Evaluate public input
2. Revise ordinance as warranted
3. City Manager and Mayor agenize item in consideration of current economy and climate conditions
4. Council Public Hearing - Ordinance introduction
5. Council Public Hearing - Ordinance adoption
6. Effective date - 30 days after Council adoption



Overview of Ordinance 2020-04



Nonresidential Reach Codes Overview

City of Encinitas Public Meeting
June 15, 2020



Agenda

- Proposed Reach Code Requirements
- Cost-effectiveness of Proposed Reach Codes

Proposed Reach Code Requirements

Proposed Codes

1. Commercial Solar Photovoltaic (PV)

a) EMC Section 23.12.080

2. Commercial Energy Efficiency

a) EMC Section 23.12.110

Solar PV Code Applicability

1. All **New** Nonresidential, certain Multi-Unit Residential, and Hotel/Motels
2. **Existing** Nonresidential, certain Multi-Unit Residential, and Hotel/Motels:
 - a) **Additions** that increase total roof area by at least 2,000 sq. ft.; or
 - b) **Alterations** with a permit value of at least \$1,000,000 that affect at least 75% of gross floor space.

Solar PV Requirements

PV System Sized based on **ONE** of the following methods:

1. Gross Floor Areas of Building; or
2. Time Dependent Valuation (TDV)



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

Gross Floor Area Method

- **Gross floor area $\geq 10,000$ sq. ft.:** at least 15 kilowatts direct current (kWdc) per 10,000 sq. ft. of gross floor area.
 - Note: PV system size = 15 kWdc X (Gross Area / 10,000 sq. ft.) where resulting product shall be rounded to nearest whole number.
 - For example, an applicant with a 126,800 sq. ft. building shall install a minimum 191 kWdc PV system; or

Gross Floor Area Method

- **Gross floor area < 10,000 sq. ft.:** a minimum size of 5 kWdc.
 - Applicants should right-size PV systems based on buildings' electrical demand to improve system's cost effectiveness.
 - Applicants should also ensure that the PV system meets electrical corporation net energy metering (NEM) requirements, if applicable.

Time Dependent Valuation (TDV) Method

- The installed PV system must offset 80% of the building's TDV energy on an annual basis.
 - Total building TDV energy use shall include both conditioned and unconditioned space
 - Calculated using modeling software or other methods approved by the Building Official.

Solar PV Exceptions

1. **Infeasibility:** The requirement may be waived or reduced where the Building Official determines that there are sufficient practical challenges that make compliance infeasible, including:
 - A. Building site location;
 - B. Limited rooftop availability; or
 - C. Shading from nearby structures, topography, or vegetation.



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Solar PV Exceptions

2. Renewable Generation:

The requirement may be waived or reduced, by the maximum extent necessary, if it is satisfied through the use of alternative on-site renewable generation, such as wind energy systems.



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

Solar PV Exceptions

3. Greenhouse structures

used for commercial cultivation, educational purposes, or the conservancy of plants or animals are exempted from the requirements of Section 120.10.



[This Photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#)

Energy Efficiency Code Applicability

1. All **New** Nonresidential (including Mixed Use Portion), certain Multi-Unit Residential, and Hotel/Motels
2. **Existing** Nonresidential, certain Multi-Unit Residential, and Hotel/Motels:
 - a) **Additions** of 1,000 sq. ft. or more; or
 - b) **Alterations** with a permit value of at least \$200,000.

Energy Efficiency Code Sections

1. Energy Efficiency
2. Renewable Energy
3. Elevators, Escalators, and Other Equipment
4. Steel Framing



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Energy Efficiency

Comply with A) 2019 CalGreen Building Standards Tier 1 performance standards for Energy Budgets and B) use as least **ONE** of the following measures for all applicable components of the project:

1. Outdoor lighting that is not greater than 90% of the allowed outdoor lighting power and a color temperature no higher than 3000K for hardscape lighting;
2. Service water heating for restaurants that comply with Section 140.5 of the California Energy Code;
3. Warehouse dock seal doors required where dock doors are adjacent to conditioned spaces; or
4. Daylight design power adjustment device(s).

Renewable Energy

Buildings must use:

1. On-site renewable energy sources (e.g., solar or wind) consistent with CalGreen Tier 1 standards; **or**
2. Participate in a renewable energy portfolio program of a local utility provider that provides a minimum of 75% electric power from renewable energy.

Renewable Energy Requirement Exceptions

1. If the project is new, adds at least 2,000 sq. ft. of total roof area, or is an alteration with a permit value of at least \$1,000,000 that affects at least 75% of gross floor space, then it may alternatively comply with the PV Requirement found in EMC 23.12.080 B.
2. An applicant may apply for a waiver or reduction for infeasibility. Infeasibility is determined at the discretion of the building official on a case-by-case basis.

Elevators, Escalators, and Other Equipment

Buildings with more than one elevator or two escalators must provide controls to reduce energy demand:

- Use a regenerative drive system while elevator or escalator is in motion
- Turn off lights and fan automatically until elevator is called.
- Controls must meet energy reduction requirements and not interrupt emergency operations.

Steel Framing

Projects with steel framing must maximize energy efficiency to avoid thermal bridging per 2019 CalGreen Standards, including:

- Exterior rigid insulation;
- Punching large holes in the stud web without affecting the structural integrity of the stud;
- Spacing the studs as far as possible while maintaining the structural integrity of the structure; and
- Detailed design of intersections of wall openings and building intersections of floors, walls and roofs.

The background is a solid dark blue color. On the right side, there are several curved, overlapping lines in a lighter shade of blue, creating a sense of motion or a stylized graphic element.

Cost-Effectiveness of Proposed Reach Codes

Cost-Effectiveness – Nonresidential Solar PV

- Cost-effectiveness study conducted by TRC Energy Services¹
- Evaluated solar PV for new construction and major retrofits for 4 commercial building types:
 - Small Office (5,502 ft²)
 - Medium Office (53,628 ft²)
 - Warehouse (49,495 ft²)
 - Retail Strip Mall (9,375 ft²)

TRC (2019). [Carlsbad Energy Conservation Ordinance Cost Effectiveness Analysis](https://www.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=37506). PDF.
<https://www.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=37506>

Cost-Effectiveness – Nonresidential Solar PV

New Construction	Small Office	Medium Office	Warehouse	Retail Strip Mall
PV Size	5 kW	80 kW	74 kW	5 kw
Upfront Cost	\$10,650	\$171,341	\$158,137	\$10,650
Investment Tax Credit (ITC)	(\$2,059)	(\$33,126)	(\$30,573)	(\$2,059)
1st Inverter Replacement ¹	\$750	\$12,066	\$11,136	\$750
2nd Inverter Replacement ¹	\$600	\$9,653	\$8,909	\$600
Annual Maintenance	\$100	\$1,609	\$1,458	\$100
Annual Energy Savings (kWh)	8,190	131,764	121,609	8,190
15-Year Net Costs ²	\$10,494	\$168,835	\$155,823	\$10,494
15-Year Net Savings ²	\$27,682	\$346,008	\$272,625	\$22,026
Benefit-Cost Ratio	2.6	2.0	1.7	2.1

¹ Using an estimated useful life of 11 years for inverters.

² 15-year net costs and savings are discounted cash flows using a 3% discount rate.

Cost-Effectiveness – Nonresidential Solar PV

Major Alteration	Small Office	Medium Office	Warehouse	Retail Strip Mall
PV Size	5 kW	80 kW	74 kW	5 kW
Upfront Cost	\$11,900	\$191,452	\$176,697	\$11,900
Investment Tax Credit (ITC)	(\$2,301)	(\$37,014)	(\$38,873)	(\$2,301)
1st Inverter Replacement ¹	\$750	\$12,066	\$11,136	\$750
2nd Inverter Replacement ¹	\$600	\$9,653	\$8,909	\$600
Annual Maintenance	\$100	\$1,609	\$1,458	\$100
Annual Energy Savings (kWh)	8,190	131,764	121,609	8,190
15-Year Net Costs ²	\$11,503	\$185,057	\$166,083	\$11,503
15-Year Net Savings ²	\$28,563	\$453,105	\$278,098	\$34,962
Benefit-Cost Ratio	2.5	2.4	1.7	3.0

¹ Using an estimated useful life of 11 years for inverters.

² 15-year net costs and savings are discounted cash flows using a 3% discount rate.

Cost-Effectiveness – Nonresidential Energy Efficiency

- Statewide cost-effectiveness study conducted by TRC Energy Services and EnergySoft¹
- Evaluated an energy efficiency package for 3 commercial building types with 2 energy source configurations:

Building Type

- Medium Office (53,628 ft²)
- Medium Retail (24,691 ft²)
- Small Hotel (42,552 ft²)

Energy Source Configuration

- Mixed-fuel
- All-electric

TRC, EnergySoft (2019). [2019 Nonresidential New Construction Reach Code Cost Effectiveness Study](https://localenergycodes.com/download/801/file_path/fieldList/2019%20NR%20NC%20Cost%20Effectiveness%20Study-2019-07-25.pdf). PDF
https://localenergycodes.com/download/801/file_path/fieldList/2019 NR NC Cost Effectiveness Study-2019-07-25.pdf

Cost-Effectiveness – Nonresidential Energy Efficiency

Mixed-Fuel Commercial	Medium Office	Medium Retail	Small Hotel
Electricity savings (kWh/yr)	41,817	17,170	5,352
Natural gas savings (therm/yr)	(6)	136	424
15-Year Net Costs ¹	\$66,649	\$5,569	\$21,824
15-Year Net Savings ¹	\$204,394	\$74,479	\$26,699
Net Present Value ¹	\$137,745	\$67,910	\$4,876
Benefit-Cost Ratio	3.1	13.2	1.2

¹ 15-year net costs and savings are discounted cash flows using a 3% discount rate.

Cost-Effectiveness – Nonresidential Energy Efficiency

All-Electric Commercial	Medium Office	Medium Retail	Small Hotel
Electricity savings (kWh/yr)	33,318	14,350	(53,308)
Natural gas savings (therm/yr)	950	522	8,188
15-Year Net Costs ¹	(\$3,676)	(\$18,193)	(\$1,266,354)
15-Year Net Savings ¹	\$256,704	\$127,461	(\$81,338)
Net Present Value ¹	\$260,380	\$145,654	\$1,185,015
Benefit-Cost Ratio	> 1	> 1	15.6

¹ 15-year net costs and savings are discounted cash flows using a 3% discount rate.

Tax Credits For Commercial Properties

A commercial property owner may earn a tax credit under the Investment Tax Credit (ITC) for renewable energy projects:

Construction Commence Year	Percentage
2020	26%
2021	22%
2022 and Beyond	10%



This [Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Financing Options

There are several loan and lease options where no upfront capital is required, including:

- Conventional loans or Property Assessed Clean Energy (PACE) Program
- Operating Leases
- Capital Leases
- Power Purchase Agreements (PPAs)

Options for Multi-Tenant Commercial Properties

For renewable energy systems on multi-tenant commercial properties, landlords have options for allocating renewable energy and/or benefits from onsite renewable energy to tenants, including:

- Virtual Net Metering (VNM)
- Net Energy Metering Aggregation
- Market Solutions

Thank you

Scott Anders

scottanders@sandiego.edu

Joseph Kaatz

kaatzj-11@sandiego.edu

Marc Steele

marcsteele@sandiego.edu



Questions and Answers



Next Steps



NEXT STEPS

1. Evaluate public input
2. Revise ordinance as warranted
3. City Manager and Mayor agenize item in consideration of current economy and climate conditions
4. Council Public Hearing - Ordinance introduction
5. Council Public Hearing - Ordinance adoption
6. Effective date - 30 days after Council adoption

